

REMARKS

Reconsideration and allowance are requested in view of the amendments and remarks herein.

The Examination

Claim 4 was objected to because of informality. We have corrected this informality according to the Examiner's suggestions.

Claims 1, 4, 5 and 23 were rejected under 35 U.S.C. Section 102(b) as being unpatentable over US Patent 5,316,008 Suga et al. ("Suga"). We have amended independent claims 1 and 23; dependent claims 4 and 5 depend on independent claim 1.

Claims 7, 8-11, and 14 were rejected under 35 U.S.C. Section 103(a) as being unpatentable over Suga in view of U.S. Patent 6,616,613 to Goodman ("Goodman"). We have amended dependent claims 7-9. Dependent claims 10, 11, and 14 depend on amended independent claim 1.

Claims 18 and 20 were rejected under 35 U.S.C. Section 103(a) as being unpatentable over Suga in view of U.S. Patent 5,054,494 Lazzaro et al. ("Lazzaro"). Dependent claims 18 and 20 depend on amended independent claim 1.

Claims 24 and 26 were rejected under 35 U.S.C. Section 103(a) as being unpatentable over Suga in view of U.S. Patent 6,443,906 to Ting et al. ("Ting"). We have amended independent claim 24; claim 26 depends on this claim.

Claim 25 was rejected under 35 U.S.C. Section 103(a) as being unpatentable over Suga in view of Ting and in further view Goodman. Dependent claim 25 depends on amended independent claim 24.

Amended and New Claims

In order to more clearly describe the invention, we have amended claims 1, 4, 7-9, 22, 23, and 24. With these amendments claims 1, 4, 5, 7-11, 14, 18-20, and 22-26 are pending in this Application.

Specifically, as amended, independent claims 1 and 22-24 describe a hand-held device for monitoring a patient's blood pressure that features first and second optical modules mounted on a hand-held component configured to be held proximal to the patient's skin. Both optical modules operate in a reflective mode and, during operation, generate separate sets of information. Claims 1, 23, and 24 describe a hand-held component that also supports an electrical sensor featuring an electrode pair that generates an additional set of information during operation. A processing module, mounted in the hand-held component, receives the sets of information from the first and second optical modules and the electrical sensor. It then calculates a first time difference between the sets of information from the optical sensors, and a second time difference between sets of information from the electrical sensor and at least one of the optical sensors. The processing module then compares the first and second time differences to a mathematical model to calculate a blood pressure value. Claim 22 also includes two optical modules, but replaces the electrical sensor with a pressure-delivering component configured to apply a pressure to the patient's skin.

Support for these amendments is found throughout the specification, particularly in Figs. 2A, 2B, 3 and 11, and by the text in paragraphs [60] - [70].

The Prior Art

The Examiner cited the following prior art references in the Office Action mailed May 12, 2006.

Suga describes a wrist watch that features a single optical sensor and a pair of electrical sensors for measuring signals from a patient. During operation, the patient wears the wrist watch on one wrist, and places fingers from an opposing hand on the optical and electrical sensors. A pulse transit time is extracted from the signals and then used to calculate a blood pressure.

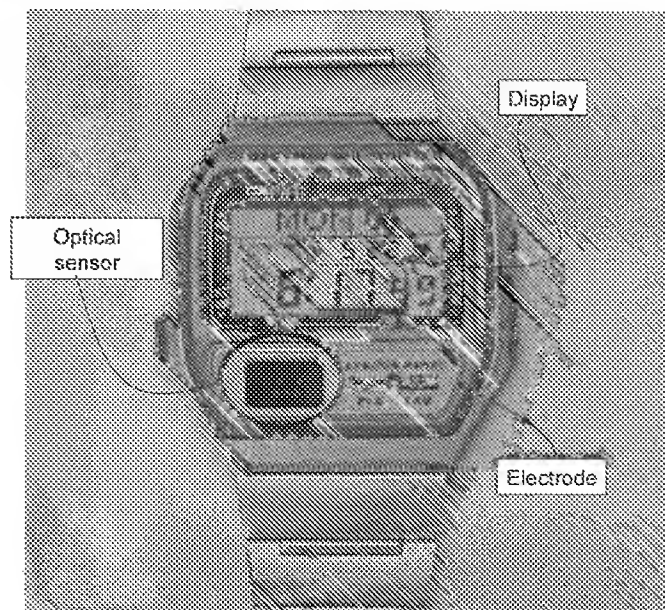
Goodman describes a variety of blood pressure-monitoring devices, each featuring a single optical sensor that measures an optical signal. A processor analyzes the optical signal along with calibration information to determine blood pressure, which is then sent wirelessly to a computer system.

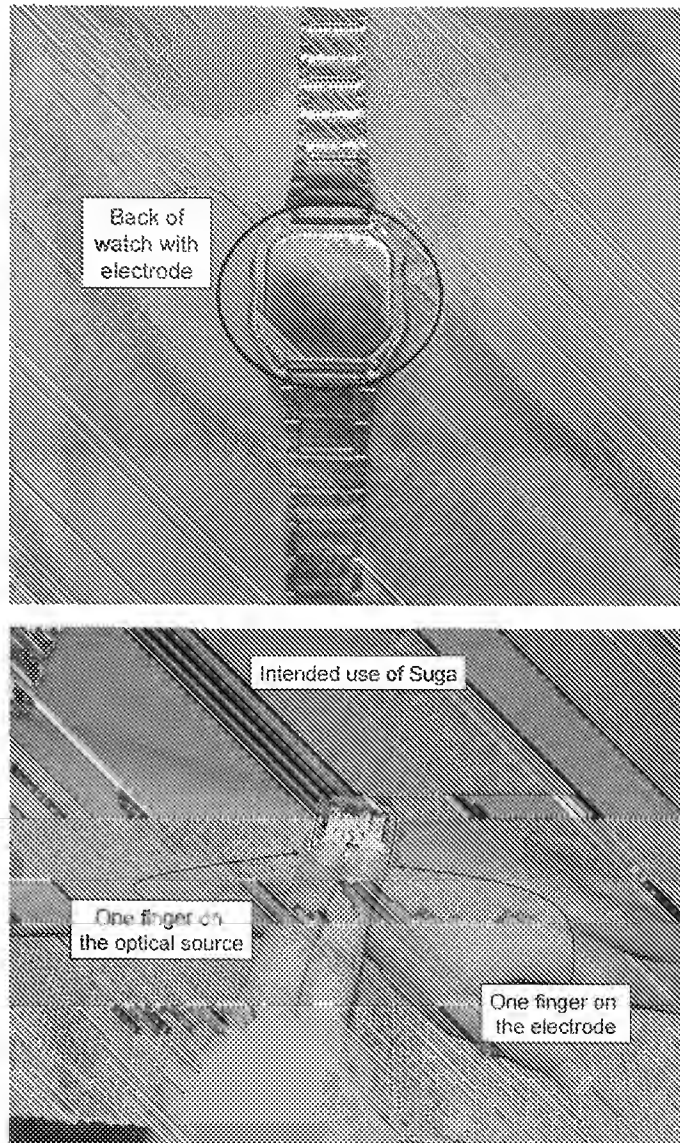
Lazzarro describes a cuff-based blood pressure monitor that includes a serial interface.

Ting describes a blood pressure-monitoring device featuring a wrist-worn, intra-arterial cannula, a transducer pressure sensor, and a processing component.

Patentability Over The Prior Art

The prior art fails to disclose the invention recited in our amended claims. Specifically, independent claims 1 and 22-24 now describe a hand-held device featuring a pair of reflective-mode optical sensors, an electrical sensor (or, alternatively, a pressure-delivering component in claim 22), and an on-board processor. The pair of optical sensors and the electrode pair generate two time differences which are used to calculate blood pressure. In contrast, Suga, the Examiner's primary reference, describes a wrist watch featuring just one optical sensor and an electrode pair, located on the watch's outer and inner surfaces. These sensors generate a single time difference to calculate blood pressure. To highlight this difference, we attach below photographs from an actual device described in Suga. They show how Suga's device makes a measurement when it is worn on a user's wrist: the user's skin contacts the electrode on the watch's inner surface, and their fingers from an opposite hand contact the single optical sensor and the second electrode on the watch's outer surface. The two electrodes measure a time-dependent electrical signal, while the single optical sensor measures a single time-dependent optical signal. An on-board processor in the watch calculates a single time difference between these two signals and, using a calibration, estimates the user's blood pressure.





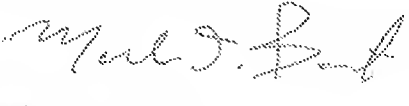
As described above, the claimed invention now includes two optical sensors. And the on-board processor calculates two time differences—one between the two optical signals, and the other between the electrical signal and at least one of the optical signals—to measure blood pressure. Our specification describes how the use of two optical sensors, combined with an electrode pair, results in an accurate, cuffless measurement of blood pressure (see, e.g., Figs. 3 and 11, and the text in paragraphs [60] - [70]). This measurement is simply not possible with the system described in Suga.

The Examiners secondary references, Goodman, Lazzarro, and Ting, fail to cure the deficiencies of Suga. Specifically, these references fail to describe a

pair of optical modules that operate in concert with an electrode pair to make a blood pressure measurement. Goodman describes a just single optical sensor, no electrical sensor, and is completely silent to using a time difference between his optical signal and another signal to calculate blood pressure. Lazzarro and Ting are even further removed, failing to describe either an optical or electrical signal. Thus even if these references are combined, which we assert can only be done using hindsight reconstruction, the references fail to include all the features of the amended claims.

In summary, the Examiner's primary reference applied to the independent claims --Suga-- fails to disclose all the limitations of the amended claims. The secondary references --Goodman, Lazzarro, and Ting-- fail to cure these deficiencies. We therefore submit that the independent claims of the present invention, as amended, are significantly removed from these references. The dependent claims are even further removed. We therefore respectfully request a notice of allowance for all the pending claims of the present Application.

Respectfully Submitted,

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